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TCS-8048-66
Copy No. 6
1 September 1966

MEMORANDUM FOR: DD/I Planning Officer

SUBJECT : Proposed NPIC Integrated Information System

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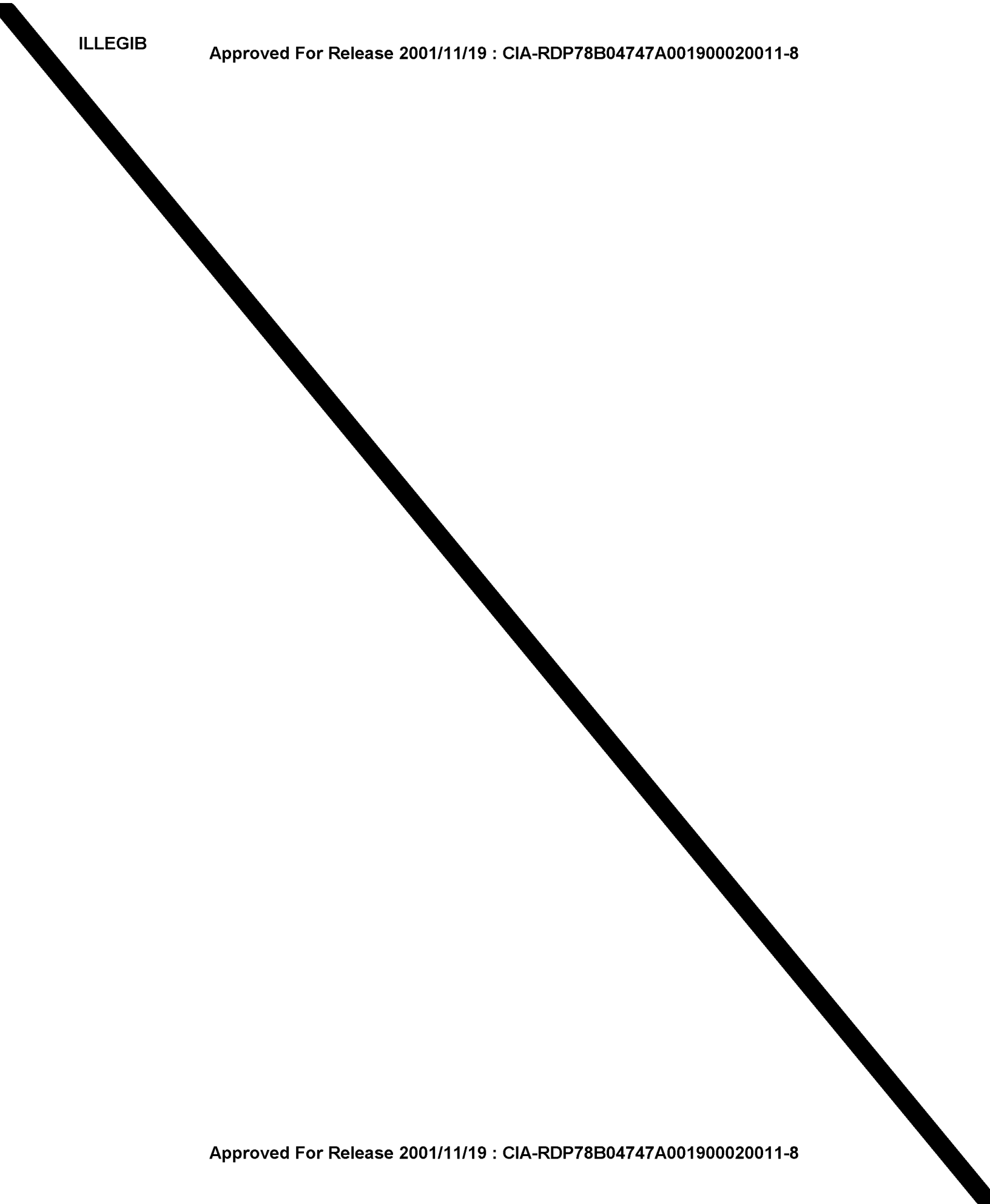
1. This is in response to your request for a review of the [redacted] reports on the proposed NPIC Integrated Information System. I had hoped that the comments could be easily divided into those aspects of the proposed system which would have a relation to the OCS mission and comments on report content which may be useful on other subjects not necessarily under the purview of this Office, i.e., those of a disinterested systems analyst. This proved to be impractical, so I should state at the outset that it is hoped that these comments will be interpreted constructively--and I apologize in advance for trespassing in areas beyond my responsibility.

2. The first point that comes to mind is that the report is amazingly comprehensive, considering the limited resources and time available for executing the Phase I activities. The methodology followed by the group is basically sound, and the exposition is clear. The fact that these two attributes are rarely evident in studies of this kind, however, tends to disguise a disturbing lack of depth in meaningful analysis of the NPIC problem. Casual reading of the report leaves one with a very favorable impression of its contributors, but, upon more careful reading, serious doubts come to mind. The basic difficulty is that there is a large gap between the exhaustive description of current procedures and the description of the proposed system design. Having read the former, one would have expected to find:

a. A careful review of how well the current system is meeting needs as expressed by its customers.



Approved For Release 2001/11/19 : CIA-RDP78B04747A001900020011-8

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made in the paragraph on "Information Handling Requirements of the Center," which is restricted to analysis of individual data elements with little attempt to show the relationships between these data elements (other than to indicate what ultimate products are affected by them). In the analysis of the individual data elements, automation was considered at least "desirable" in all cases except for the foreign publications and "general library material" which "should perhaps be considered at a later time." This is an example of a basic theme that runs throughout the report--namely, that the computer is to become the hub of NPIC operations.

5. The logic of Paragraph 4.1.2 of SCR 273, "Internal Center Demands," is confusing. The basic point seems to be that, since current demands cannot be met, there is an implicit and natural objective to apply more automation. I would guess that systematizing data processing operations is not the only problem; the lack of systems and programming people is probably more basic. One wonders how such current requirements, plus the development of a new system, can be done within the current IPD T/O (as suggested in Paragraph 7.8 of SCR 288).

6. The report shows that the basic requirements can be met by the proposed design; it fails to show why it is the best solution. A vague attempt is made to justify the design by mentioning broad design criteria and figures of merit as mirrored against three alternative configurations. Since these alternatives are not described and more specific criteria are not given, the discussion is almost meaningless. For example, the response time specifications, which indicate that anything in excess of 30 seconds is intolerable, may have been the result of NPIC guidance, but requires some elaboration. Specifically, response to what--computational requirements, data retrieval, or report generation requirements, or all of them? Perhaps a more modest change from the current procedures might have been considered. That is, the Collateral Support Division now seems to have sufficient lead time to provide the necessary backup material to the PI prior to availability of mission photography. The basic point here is that the design seems to assume that no processing requirements can be anticipated. I doubt that this is so; the more conventional report generation facility, activated well in advance of the requirement for data, should suffice in many cases.

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7. Paragraphs 7.3 through 7.7 of SCR 288 do little to convince the reader that the system meets even the more obvious requirements. For example, the report suggests that any computer with a communications handling capability is "compatible" with any other such computer. Secondly, the system has "flexibility" and "expandability" because a modular general-purpose computer is recommended. Finally, the statement on "ease of phase-in" does not agree with the statements and graphs in the "Program Implementation Plan," SCR 289. A system of this size indeed must be introduced "piecemeal," but the manner in which this is done must be carefully planned so that the transition is not disruptive and that each system module is compatible with others previously implemented.

8. Because of the proposed extensive use of the computer in NPIC operations, and because the term "Integrated System" is used, the human element of NPIC should have been given at least equal attention in the design description. There is little indication of what the impact of this system would be on the PI, on the functions performed by the Collateral Support Division, and on other components of the Center. The impact obviously would be considerable, but one could only suspect what it would be.

9. The design assumes a completely independent facility. Other Agency capabilities should have been given consideration to either partially meet or back up the NPIC requirement. Such facilities include:

a. The reference services now available in OCR, as well as the projected services under Project CHIVE. Mention is made of an NPIC ground photography subfile and an all-source document index--files apparently duplicated in OCR.

b. The computer-supported photo-composing facilities now available in OCS and PSD.

c. The use of other Agency computers as backup to the NPIC facility.

d. The possible inter-connection of such computers with the proposed NPIC facility.

10. The computer configuration recommended is one in which two electronically linked computers are used, each assuming a different portion of the data processing requirements. At the same time, it is stated that the dual computer configuration will provide a "fail soft" capability, i.e., one computer can take at least the priority load if the other of the pair is inoperative. Current hardware and software technology suggests that, if the latter consideration is important, a duplex configuration should be programmed so that given tasks are not assigned a priori to each machine; rather, both are capable of performing all functions and the allocation of tasks to each machine is determined dynamically. The latter concept is called "multi-processing" and the one recommended by [redacted] 25X1A is called "direct coupling." 25X1A

11. The interdependence of the five basic computer program packages is neglected. For example, there is no indication whether the "user language package" is meant to provide the basic man/machine command communications for all the other packages. The same thing is true of the "presentation package"--is this the output mechanism for computation as well as file updating and retrieval? If the answers to the above questions are yes, the proposed programming system is one of the most ambitious I have encountered.

12. The description of the "data entry device" in Paragraph 6.1.5.3 of SCR 288 is confusing. One sentence states that the "keyboard" is to convert material to machine readable form, another states that an optical reader will perform this function. The two devices seem to be tied together in some undefined way.

13. Under "Computational Programs" (Paragraph 5.2.2.1 of SCR 288) the statement is made that such programs "seldom change." We have not found this to be true, and I would believe that NPIC would agree. In fact, these kinds of programs tend to require constant attention.

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14. The personnel requirements, Paragraph 5.3 of SCR 288, appear to be optimistic. For example, a "data management package" is only one of several to be included in the system. This kind of package constitutes almost the totality of the CHIVE programming effort, which is being supported by about 25 programmers over a longer period of time than the [redacted] schedule for NPIC. 25X1A

15. The suggested costs of the computer configuration ([redacted] seem modest. If two computers are used, this is only [redacted] a month for each machine. To provide some comparison, the smallest third-generation computer now in the OCS Computer Center (used only for input/output operations and small time-sharing experiments) has a monthly rental cost of [redacted]. A data base of three billion bits is projected. Assuming a 30 per cent increase for overhead and directories to the files, 11.7 billion bits of storage may be required. Based on IBM rental prices for 2314 disc storage devices (capacity 200 million bytes), eight such devices would be required. The cost of storage alone would be [redacted] per month.

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16. Paragraph 7.9 of SCR 288 on costs indicates [redacted] per year of contractor programming assistance is required. This contradicts the figures in SCR 289, which indicates that the contractor is going to have more than an "assisting" role and includes contractor expenditures of about [redacted] for at least the first two years. There is also a contradiction in contractor manning: the implementation plan states that 42 contractor people will be required for the first two years. This totals 84 man/years, which is in conflict with Paragraph 5.3 of SCR 288, which states that 85 contractor man/years will be required over a five-year period.

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17. One could infer from the program implementation plan that the contractor is going to take the central role in the development of the system with some support from IPRD. It is not clear what the latter's role will be. Past experience indicates that delegation of this kind of authority to contractors presents significant risks.

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18. There is no indication in the implementation plan that:

a. There will be a gradual phase-in of system elements.

b. Any evaluation of system performance will be made.

c. Any experimentation with the more radical techniques will be undertaken.

Group 2 and 3 tasks mentioned in Paragraph 3.3 of SCR 288 are not mentioned in the implementation plan. It should be noted that the [redacted] projected for Phases II through IV will not provide for some types of consoles, photo-composing equipment, optical readers, shaft encoding devices, related data processors and programming--all included under Group 2 and 3 tasks. 25X1A

19. The implementation schedule suggested by [redacted] appears optimistic on several counts. For example, only one year is provided for all computer programming--and this without the availability of the system hardware. Only six months is allowed for conversion of the data base, and Agency personnel are to be trained in less than one month. 25X1A

20. In summary, an undertaking of this magnitude could have significant impact on a large and significant portion of Agency activities. This obviously requires thorough review on the part of Agency management, and requires inputs beyond those available in the subject report. This is a good first step, but a comparable effort should be undertaken by in-house personnel, using the [redacted] report as a springboard. The "all or nothing" connotation of the recommended system should not be an impediment to the gradual evolution of NPIC data processing facilities as long as realistic long-range goals are defined. 25X1A

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Deputy Director of Computer Services

cc: C/IPD/NPIC
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